

re·sil·ience: *noun*
the capacity to recover
quickly from difficulties





FIONA MA, CPA
TREASURER
STATE OF CALIFORNIA

October 1, 2019

Dear friends,

California's cost of borrowing, which drives debt affordability, is driven by multiple factors. These factors are both fundamental and technical in nature. Fundamental factors include the economy, taxation, and monetary policy at the federal level. The supply of investment funds and the availability of bonds to satisfy that demand are the technical factors. Recently, California has benefitted from each of these factors. Our cost of borrowing remains low and the supply of funds available to invest in our bond offerings remains high.

The Tax Cuts and Jobs Act of 2017 made substantial changes to the tax rates and the tax base for individuals. The new law repealed personal exemptions and limited the deductibility of taxes paid to state and local governments. As a result, state and local government bonds, which are frequently issued as free of federal income taxation on the interest received, became more attractive to certain investors.

The Federal Reserve System (sometimes called, "the Fed") has pursued an accommodative policy since the Great Recession that has produced record low interest rates for most of the past decade. When Congress created the Fed in 1913, it created a unique central bank. Despite the independent ownership of the twelve individual Federal Reserve banks, the Board of Governors of the Federal Reserve is an independent government agency, with oversight responsibilities for both the reserve banks and the conduct of monetary policy in the U.S. economy.

Among the most important functions the Fed performs, operating through its Federal Open Market Committee, or the FOMC, is the implementation of monetary policy, through actions designed to foster price stability and maintain sustainable economic growth in our economy. The FOMC primary tool is the management of short-term interest rates, upon which most other interest rates are built.

The Fed's FOMC operations affect the amount of money and credit available in the U.S. banking system, thereby affecting interest rates, which in turn affect the spending decisions of households and businesses -- and ultimately the overall performance of the U.S. economy. These actions also affect the cost of borrowing money for California.

Since the last Debt Affordability Report in October 2018, economic growth rates have slowed and changes in geopolitical situations have introduced greater uncertainty into the capital markets, including the sector of the market that California accesses to borrow money. Stimulated by these worldwide events, the Fed has recently begun reducing interest rates in the U.S. for the first time since the Great Recession.

At the same time, the supply of funds available for investment has grown. Since January 2019, my office has sold approximately \$7.5 billion of general obligation bonds, including \$5.4 billion that refinanced older, higher-interest rate debt. These refinancings will save Californians approximately \$2.1 billion in reduced debt service costs over the remaining life of the bonds.

In August 2019, California's credit rating was upgraded by Fitch Ratings from AA- (minus) to AA. In publicizing the rating change, Fitch cited reductions in budgetary borrowings, and the continuing commitment to set aside funds for California's rainy day fund.

Taken together, these are all positive outcomes for California -- lower borrowing costs, a favorable interest rate environment, improved ratings, and a continued commitment to building reserves for the inevitable downturn in the economy.

These actions will make the state more resilient and ensure that we are better prepared to deal with whatever the global economy has in store in the future.

This Debt Affordability Report seeks to provide policymakers and the public with information on California's debt profile and the market for California's bonds to better assist with decisions about incurring debt in the future. Included in those decisions will be important matters relating to California's economic vitality, affordable housing for all Californians, protection of our environment, and the education of our children. By seeking the best debt solutions for those challenges, when applicable, we can ensure that the power of debt, when smartly implemented, can benefit our fellow citizens in a way that is visible, positive, and fair.

In Peace and Friendship,

A handwritten signature in black ink, appearing to be 'Fiona Ma', written in a cursive style.

FIONA MA, CPA
California State Treasurer

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PREFACE

Government Code section 12330 requires the State Treasurer to submit an annual Debt Affordability Report (DAR) to the Governor and Legislature. The report must provide the following information:

- A listing of authorized but unissued debt the Treasurer intends to sell during the current year (2019-20) and the following year (2020-21), and the projected increase in debt service as a result of those sales.
- A description of the market for state bonds.
- An analysis of state bonds' credit ratings.
- A listing of outstanding debt supported by the General Fund and a schedule of debt service requirements for the debt.
- A listing of authorized but unissued bonds that would be supported by the General Fund.
- Identification of pertinent debt ratios, such as debt service to General Fund revenues, debt to personal income, debt to estimated full value of property and debt per capita.
- A comparison of the pertinent debt ratios for the state with those of the 10 most populous states.
- The percentage of the state's outstanding general obligation (GO) bonds comprised of fixed rate bonds, variable rate bonds, bonds that have an effective fixed interest rate through a hedging contract and bonds that have an effective variable interest rate through a hedging contract.
- A description of any hedging contract, the outstanding face value, the effective date, the expiration date, the name and ratings of the counterparty, the rate or floating index paid by the counterparty, and an assessment of how the contract met its objectives.

NOTES ON TERMINOLOGY

- This report frequently uses the words “bonds” and “debt” interchangeably, even when the underlying obligation behind the bonds does not constitute debt subject to limitation under California's constitution. This conforms to the municipal market convention that applies the terms “debt” and “debt service” to a wide variety of instruments, regardless of their precise legal status.
- The report references fiscal years without using the term “fiscal year” or “fiscal.” For example, 2019-20 means the 2019-20 fiscal year ending June 30, 2020.

SECTION 1 | MARKET FOR STATE BONDS

The state is one of the largest issuers in the \$3.8 trillion U.S. municipal bond market. Over the last five fiscal years, the state has issued an average of \$7.7 billion of General Fund-supported General Obligation (GO) bonds annually. In 2018-19, the state issued \$7.0 billion of such GO bonds. Of that total, \$4.5 billion refinanced outstanding GO bonds to produce debt service savings.

The market and price for the state's bonds are affected by factors specific to the state as well as overall conditions in the debt capital markets. These factors include the economy, general market interest rates, national and state personal income tax rates, the supply of and demand for municipal bonds, investor perception of the state's credit and the performance of alternative investments, such as equities or other debt capital.

Since the last Debt Affordability Report (DAR) was published in October 2018, the municipal bond market has been significantly impacted by changes in Federal Reserve monetary policy, investors' outlook on the U.S. and global economies, and rising geopolitical and international trade tensions. In response to these events, *short-term* tax-exempt municipal bond interest rates have generally risen, while *long-term* tax-exempt interest rates have generally declined.

The continued strength of the state's credit profile, coupled with an imbalance between the supply of and demand for tax-exempt bonds, contributed to interest rates on the state's bonds outperforming those of many other municipal issuers across the country in 2018-19.

STATE-SPECIFIC FACTORS

The state's fiscal health continues to be strong. In addition to a robust economy, this ongoing strength reflects pru-

dent actions undertaken by voters, the Governor, and the State Legislature. Since 2011, the state has put into place a number of revenue initiatives and expenditure controls, consistently adopted on-time budgets, demonstrated a commitment to paying down past borrowings and deferrals and to building reserves; and the state has implemented structural institutional reforms, as well as other actions, to improve the state's fiscal health.

As a result, the ratings on the state's GO bonds have improved dramatically over the past decade. In July 2018, Moody's Investors Service (Moody's) revised the outlook on the state's GO bonds from stable to a positive outlook. Most recently, in August 2019 Fitch Ratings (Fitch) upgraded the state's GO long-term bond rating from "AA-" to "AA" while maintaining a stable outlook. Further, Moody's affirmed the state's GO rating of Aa3 with a positive outlook, while S&P Global Ratings (S&P) affirmed the state's GO rating of AA- with a stable outlook. A rating outlook is an opinion regarding the likely rating direction over the medium term. A positive outlook generally indicates a higher likelihood of a rating change over the medium term while a stable outlook generally indicates a low likelihood of a rating change over the medium term.

All of this has led to a steady decline in the state's credit spreads over the past decade. Credit spreads represent the difference in yield between two bonds of similar maturity but different credit quality. Figure 1 depicts the state's interest rate spreads to the AAA GO Municipal Market Data (MMD) index, the municipal industry's benchmark of AAA-rated state GO bonds. The state's credit spread on its 30-year bonds to the MMD benchmark has tightened from a high of more than 150 basis points at the end of 2009 to a low of four basis points in September 2018 and was nine basis points as of June 2019.

FIGURE 1

30-YEAR CALIFORNIA MMD CREDIT SPREADS TO “AAA” MMD



Source: Thomson Municipal Market Monitor (TM3)

While there have been significant improvements to the state’s financial management and economy in recent years and the state’s fiscal health is currently strong, its financial condition could still be adversely affected by a number of economic and budget risks. Risks with potentially significant General Fund impact include, among other things, the threat of a recession, revenue volatility, the cost of public employee retirement benefits, the results of the federal census, the impact of federal trade negotiations and/or policies, changes to federal legislation and/or policies that help to fund the cost of providing health care, federal tax law changes, housing constraints, impacts of climate change, and cybersecurity risks.

OVERALL MARKET CONDITIONS

The discussion below reviews the factors that impacted the larger municipal and taxable bond markets over the last fiscal year that may have also significantly affected the market for the state’s bonds. In 2018-19, the U.S. fixed-income markets initially experienced tightening and then a relaxing of monetary policy from the Federal Reserve, changes to the outlook for the global and domestic economies, geopolitical and international trade tensions and the continuing effect of U.S. tax reform.

INTEREST RATES

LONG-TERM INTEREST RATES. In 2018-19, long-term fixed-income yields initially rose and then fell following changes in Federal Reserve monetary policy and the mar-

ket’s outlook on the U.S. economy. As shown in Figure 2, from July 2018 through November 2018, as the Federal Reserve continued to tighten monetary policy to abate inflationary concerns, long-term tax-exempt interest rates, as measured by the 30-year MMD index, rose from a low of 2.90 percent to a high of 3.46 percent. Thereafter, the Federal Reserve signaled a change in its monetary policy and the market’s outlook on the economy shifted to a negative sentiment, and the same index declined to a low of 2.30 percent in June 2019. The 10-year MMD index followed a similar pattern, rising from 2.39 percent to 2.77 percent, before declining to 1.61 percent over the same period.

SHORT-TERM INTEREST RATES. While long-term tax-exempt interest rates rose during the first several months of 2018-19, as noted above, short-term tax-exempt interest rates increased throughout most of 2018-19. Federal Reserve actions and, in particular, the two increases in the target range for the federal funds rate in September and December 2018, resulted in the rise of short-term interest rates. However, in August 2019, for the first time since 2008, and again in September 2019, the Federal Reserve reduced the target range for short-term interest rates.

As shown in Figure 3, the short-term tax-exempt Securities Industry and Financial Markets Association (SIFMA) swap index and the actual average interest rates on the state’s tax-exempt variable rate demand obligations (VRDOs) continued to rise throughout much of 2018-19, with interest rates on the state’s VRDOs consistently lower than SIFMA, the national short-term index. On average, the state’s VRDOs were 36 basis points lower than SIFMA in 2018-19. As a result, notwithstanding the increase in

FIGURE 2

TRENDS OF TAX-EXEMPT INTEREST RATES



Source: Thomson Municipal Market Monitor (TM3)

FIGURE 3

SIFMA VERSUS CALIFORNIA VRDO (MONTHLY AVERAGE RATES)



Source: Thomson Municipal Market Monitor (TM3) and California State Treasurer’s Office

rates, VRDOs at these levels continued to be a source of low-cost financing for the state and have helped to diversify the state’s capital structure.

SHAPE OF THE YIELD CURVE. As discussed above, changes in Federal Reserve monetary policy and in the market’s outlook on the U.S. economy caused rates to decline across the yield curve. The yield curve reflects interest rates for fixed income assets at a set point in time for bonds having equal credit quality but differing maturity dates. Overall, the shape of the tax-exempt yield curve did not change significantly since 2017-18 and remains flat, albeit with lower interest rates. A yield curve that is positively sloped—that

is, with long-term rates higher than short-term rates—is referred to as a “normal” yield curve. When the differential between short-term and long-term rates becomes smaller, the yield curve is said to be “flattening.” In the tax-exempt bond market, in 2018-19, the yield curve continued to be flat. In August 2019, short-term tax-exempt interest rates began to invert with the one-year MMD rate actually higher than the two- to four-year MMD rates. While U.S. treasury rates began inverting earlier in 2019, which has also happened occasionally in the past, this is the first time that an inversion has ever happened with respect to the tax-exempt MMD index since it began to be published in 1989. Historically, a flattening or inverted yield curve

has sometimes predicted a coming recession. Overall, as shown in Figure 4, tax-exempt rates decreased in 2018-19 by between 26 and 85 basis points in years 1 to 10, 70 to 80 basis points in years 11 to 20 and 63 to 68 basis points in years 20 to 30.

SUPPLY AND DEMAND

Technical factors such as supply and demand for municipal bonds also affect the pricing of municipal bonds.

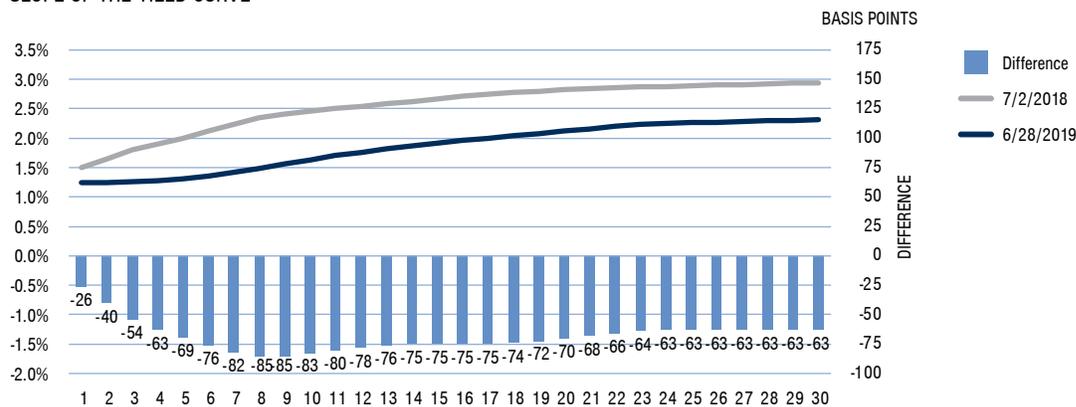
SUPPLY. The supply of municipal bond issuance in 2018-19 was significantly lower than those of the prior two

fiscal years. Figure 5 presents the cumulative volume of U.S. municipal bond issuance for the past three fiscal years. In comparison, 2018-19 national issuance volume was 19.1 percent and 17.8 percent lower than 2016-17 and 2017-18, respectively.

This decline is largely the result of the Tax Cuts and Jobs Act of 2017 (Act) which, among other things, eliminated the ability to advance refund tax-exempt bonds through the issuance of tax-exempt refunding bonds, thereby reducing overall issuance volume effective January 1, 2018. Figure 6 shows a breakdown of municipal bond issuance volume by purpose for each six-month period from July

FIGURE 4

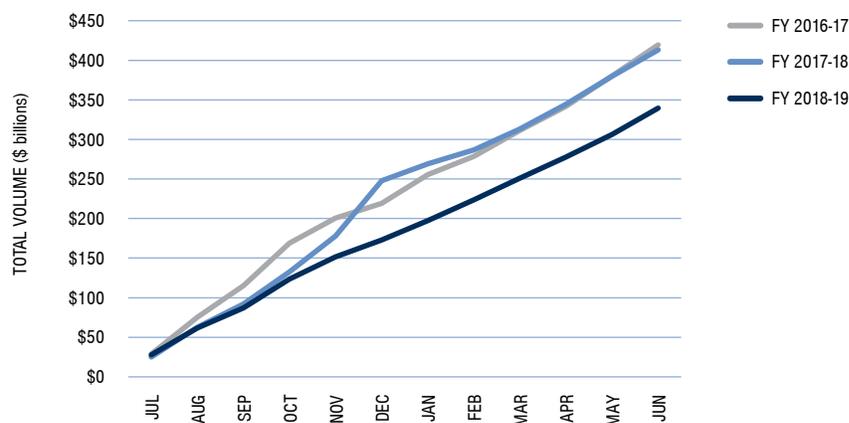
SLOPE OF THE YIELD CURVE



Source: Thomson Municipal Market Monitor (TM3)

FIGURE 5

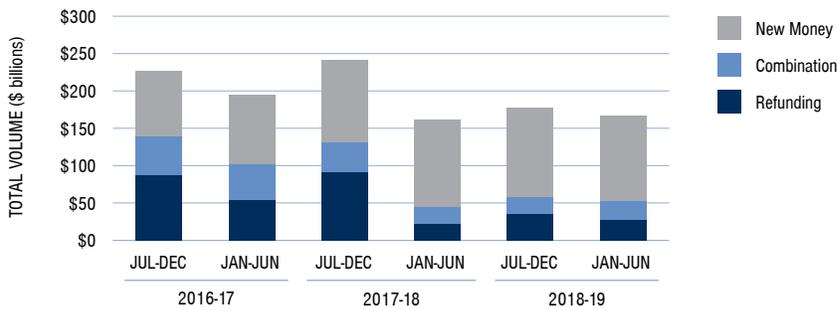
U.S. CUMULATIVE BOND VOLUME, FY 2016-17, FY 2017-18 AND FY 2018-19



Source: The Bond Buyer

FIGURE 6

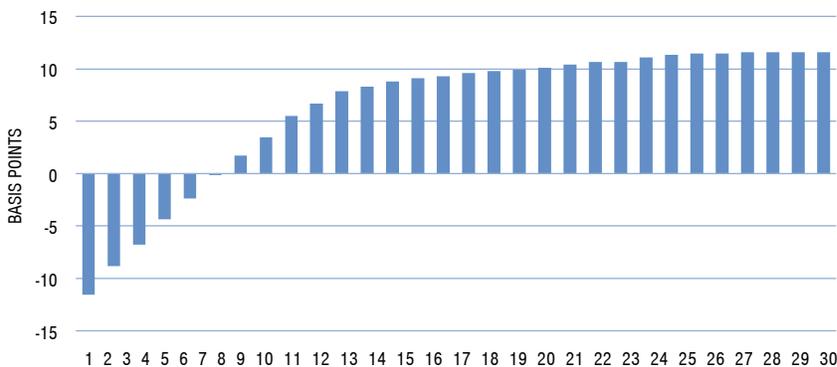
U.S. TAX-EXEMPT BOND VOLUME BY PURPOSE, FY 2016-17, FY 2017-18 AND FY 2018-19



Source: The Bond Buyer

FIGURE 7

AVERAGE SPREAD BETWEEN NATIONAL AND CA MMD IN FY 2018-19



Source: Thomson Municipal Market Monitor (TM3)

2016 to June 2019. The decline in refunding issuance volume is notable starting in the six-month period from January 2018 to June 2018, when provisions of the Act began to take effect. The resulting reduction in the supply of tax-exempt bonds contributed to the decline in tax-exempt interest rates.

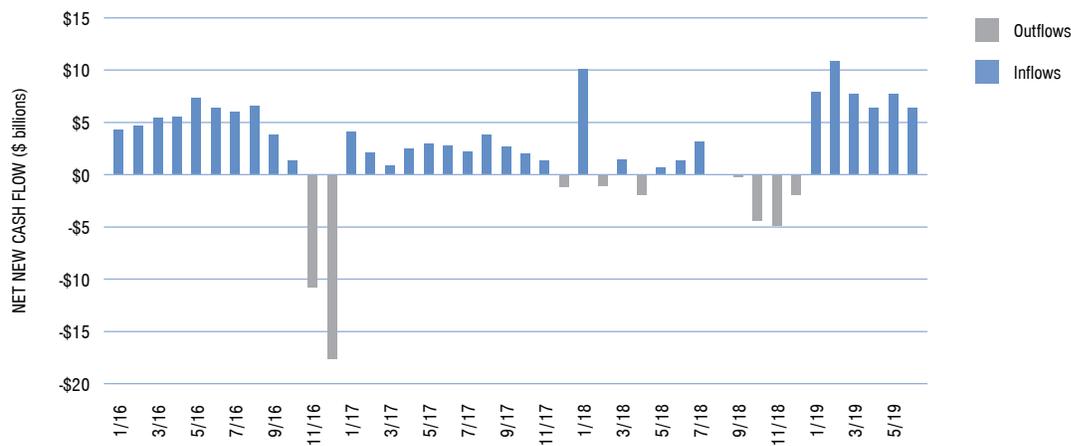
DEMAND. Because of their tax advantage, tax-exempt bonds have a more limited universe of investors than taxable bonds. Not only did the Act impact the supply of tax-exempt bonds in 2018-19, but it also had a significant impact on the composition of investor demand for tax-exempt bonds. On one hand, the Act decreased demand from certain investor segments, including banks and insurance companies, which benefited from the lower tax rates. On the other hand, the limitations on deductions for state and local income taxes, property taxes, mortgage interest and charitable contributions in the Act increased the attractive-

ness of tax-exempt bonds to retail investors and municipal bond funds, especially in bonds maturing in 10 years or less. As Figure 7 shows, for 2018-19 the spreads between the California GO MMD and national AAA GO MMD benchmarks were, on average, negative in years one through six. This is notable given the fact that the state’s GO bonds are rated in the double-A category, whereas the national MMD index is rated triple-A.

Municipal bond mutual funds represent a significant segment of the investor base for tax-exempt bonds, and asset inflows and outflows of cash for these funds can materially impact demand for municipal bonds. As shown in Figure 8, monthly inflows were positive in eight of the 12 months of 2018-19, and notably, there was a steady net inflow of funds in each month from January 2019 through June 2019. On a net basis, inflows rose from \$21.6 billion in 2017-18 to \$38.6 billion in 2018-19, an increase of 79 percent.

FIGURE 8

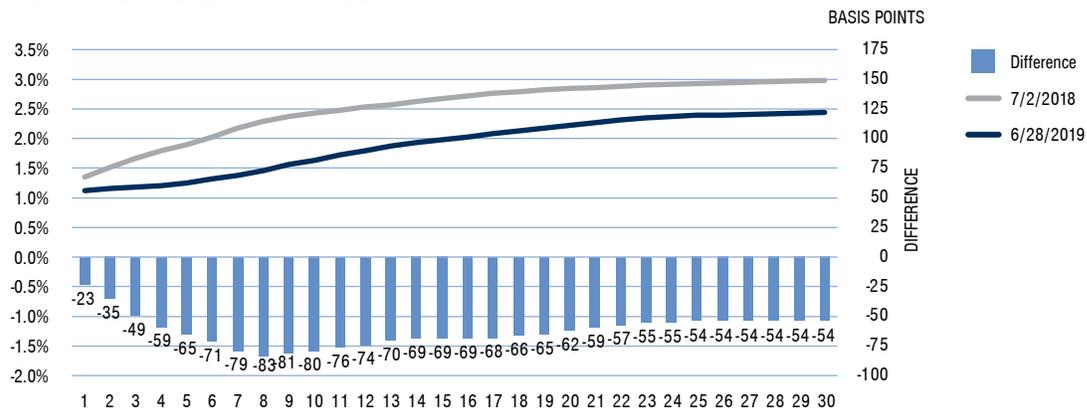
MUNICIPAL BOND MARKET, MONTHLY FUND INFLOWS / OUTFLOWS



Source: Investment Company Institute (ICI)

FIGURE 9

CALIFORNIA GO MMD BENCHMARK RATES



Source: Thomson Municipal Market Monitor (TM3)

INTEREST RATES ON THE STATE'S BONDS

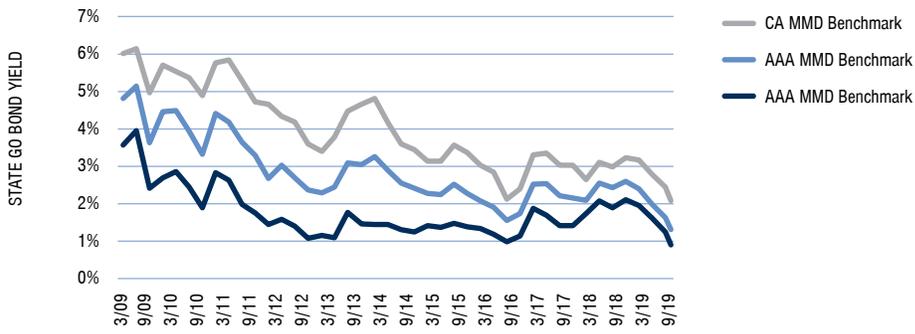
Interest rates on the state's bonds are the product of both state-specific factors and overall market conditions. With a stable and strong credit profile, the state has benefitted from the improvements in the general municipal bond market. As a result, the interest rates on the state's GO bonds are lower as of the end of 2018-19 than at the beginning of 2018-19. Figure 9 compares California GO MMD benchmark rates from the first business day of 2018-19 to those on the last business day of 2018-19. As shown, California GO MMD benchmark rates declined between 23 and 83

basis points over 2018-19. In addition, the 2018-19 rates are significantly better than the state's rates over most of the past decade, in particular for the longest maturities as shown in Figure 10.

With attractive interest rates available throughout much of the fiscal year, the state was able to refinance \$5.2 billion of its outstanding GO bonds in 2018-19 to reduce debt service costs. These refinancings generated approximately \$1.7 billion of total debt service savings over the remaining life of the bonds (or approximately \$1.3 billion on a present value basis).

FIGURE 10

5-, 10- AND 30-YEAR CALIFORNIA GO MMD



Source: Thomson Municipal Market Monitor (TM3)

SECTION 2 | SNAPSHOT OF THE STATE'S DEBT

OVERVIEW

Figure 11 summarizes the state's long-term debt as of June 30, 2019. This summary of state debt includes General Fund-supported GO bonds approved by voters and lease revenue bonds (LRBs) authorized by the Legislature, as well as self-liquidating GO bonds. Self-liquidating GO bonds receive revenues from specified sources

so that money from the General Fund is not expected to pay debt service. However, the General Fund is obligated to pay debt service should the revenues to support repayment not be sufficient. The figures include bonds the state has sold (outstanding) and bonds authorized but not yet sold. A detailed list of the state's outstanding bonds, and their debt service requirements, can be found in Appendices A and B.

FIGURE 11

SUMMARY OF THE STATE'S DEBT (a)
AS OF JUNE 30, 2019 (dollars in billions)

	OUTSTANDING	AUTHORIZED BUT UNISSUED	TOTAL
GENERAL FUND-SUPPORTED ISSUES			
General Obligation Bonds	\$72.65	\$35.55	\$108.20
Lease Revenue Bonds	8.67	6.37	15.04
TOTAL GENERAL FUND SUPPORTED ISSUES	\$81.32	\$41.92	\$123.24
SELF-LIQUIDATING GENERAL OBLIGATION BONDS			
Veterans General Obligation Bonds	\$0.81	\$0.90	\$1.71
California Water Resources Development General Obligation Bonds	0.03	0.17	0.20
TOTAL SELF-LIQUIDATING GENERAL OBLIGATION BONDS	\$0.84	\$1.07	\$1.91
TOTAL	\$82.16	\$42.99	\$125.15

(a) Debt obligations not included in Figure 11: Any short-term obligations such as commercial paper or revenue anticipation notes; revenue bonds issued by state agencies which are repaid from specific revenues outside the General Fund; and "conduit" bonds, such as those issued by state financing authorities on behalf of other governmental or private entities whose obligations secure the bonds.

- Approximately 5.15 percent of the state’s outstanding GO bonds carry variable interest rates, which is lower than the statutorily-authorized maximum of 20 percent. The State Treasurer has adopted a Debt Management Policy that, as of the date hereof, further reduces this limitation on variable rate indebtedness to 10 percent of the aggregate amount of long-term GO bonds outstanding. The remaining 94.85 percent of the state’s outstanding GO bonds have fixed interest rates.
- The state has no interest rate hedging contracts on any debt discussed in this report.

INTENDED ISSUANCE OF GENERAL FUND-SUPPORTED BONDS

The State Treasurer’s Office (STO) estimates of intended issuance are based on Department of Finance (DOF) projections of state departments’ funding needs. Projections for new-money debt issuance are based on a variety of fac-

tors and are periodically updated. Factors that could affect the amount of issuance include actual spending by departments, revised funding needs, overall budget constraints, use or repayment of commercial paper, general market conditions and other considerations. Actual issuance amounts often vary significantly from initial estimates.

Figure 12 shows the STO’s estimated issuance of new-money General Fund-supported bonds over the current and next fiscal years. Only currently authorized but unissued GO bonds are reflected in Figure 12. The estimated issuance may increase should new bond programs be approved.

As shown in Figure 12, STO preliminarily estimates the state will issue a combined \$11.4 billion of new-money General Fund-supported bonds in 2019-20 and 2020-21. Using these assumptions for debt issuance, the STO estimates debt service payments from the General Fund will increase by \$47.3 million in 2019-20 and \$467.0 million in 2020-21.¹ A detailed list of the estimated debt service requirements can be found in Appendix B.

FIGURE 12

ESTIMATED ISSUANCE, GENERAL FUND-SUPPORTED BONDS (a) (dollars in millions)

	2019-20	2020-21	TOTAL
General Obligation Bonds (b)	\$4,600	\$4,000	\$8,600
Lease Revenue Bonds	\$723	\$2,084	\$2,807
TOTAL GENERAL FUND-SUPPORTED BONDS	\$5,323	\$6,084	\$11,407

(a) Debt issuances not included in Figure 12: Any refunding bonds, short-term obligations such as commercial paper or revenue anticipation notes; revenue bonds issued by state agencies which are repaid from specific revenues outside the General Fund; and “conduit” bonds, such as those issued by state financing authorities on behalf of other governmental or private entities whose obligations secure the bonds.

(b) The initial issuance of GO bonds may be in the form of commercial paper notes.

¹ Figures reflect debt service from only a portion of the bond sales listed in Figure 12. For example, \$2.2 billion of the \$4.6 billion in GO bonds and \$416 million of the \$723 million in LRBs planned for 2019-20 will be sold during the first half of the fiscal year. These bonds will have interest payments in the second half of the fiscal year. The remaining GO bonds and LRBs to be sold in 2019-20 will not have a debt service payment during the fiscal year. The first interest payment for these bonds will be in 2020-21.

SECTION 3 MEASURING DEBT BURDEN

DEBT RATIOS

Measuring California's debt level with various ratios – while not particularly helpful in assessing debt affordability – does provide a way to compare the state's burden to that of other borrowers. The three most commonly-used ratios are: debt service as a percentage of General Fund revenues; debt as a percentage of personal income; and debt per capita. A fourth ratio – debt as a percentage of state gross domestic product (GDP) – also can be a useful comparison tool.

DEBT SERVICE AS PERCENTAGE OF GENERAL FUND REVENUES

Because debt service is considered a fixed part of a budget, credit analysts compare General Fund-supported debt service to General Fund revenues to measure a state's fiscal flexibility. California's ratio of General Fund-supported debt service to General Fund revenues was 5.82 percent² in 2018-19. That figure is based on \$8.04 billion³ of GO and LRB debt service payments versus \$138.0 billion of General Fund revenues (less transfer to the Budget Stabilization Account/Rainy Day Fund).⁴ The STO estimates this ratio will be 5.59 percent⁵ in 2019-20. That estimate is based on an expected \$8.04 billion of debt service payments versus \$143.8 billion of General Fund revenues (less transfer to the Budget Stabilization Account/Rainy Day Fund).⁴

DEBT AS PERCENTAGE OF PERSONAL INCOME

Comparing a state's level of debt to the total personal income of its residents is a way to measure a state's ability to generate revenues and repay its obligations. In its 2019 State Debt Medians report, Moody's lists the state's ratio of net tax-supported debt to personal income at 3.7 percent.⁶

DEBT PER CAPITA

Debt per capita measures residents' average share of a state's total outstanding debt. It does not account for the employment status, income or other financial resources of residents. As a result, debt per capita does not reflect a state's ability to repay its obligations as well as other ratios, such as debt service as a percentage of General Fund revenues or debt as a percentage of personal income. In its 2019 State Debt Medians report, Moody's lists the state's net tax-supported debt per capita at \$2,194.⁶

DEBT AS PERCENTAGE OF STATE GDP

Debt as a percentage of GDP generally is used to measure the financial leverage provided by an issuer's economy. Specifically, this debt ratio compares what an issuer owes versus what it produces. California has the world's fifth largest economy⁷

² Does not reflect offsets due to subsidy payments from the federal government for BABs (Build America Bonds) or transfers from special funds. When debt service is adjusted to account for approximately \$1.9 billion of estimated offsets, the 2018-19 debt service decreases to \$6.2 billion, and the ratio of debt service to General Fund revenues drops to 4.46 percent.

³ Excludes special fund bonds, for which debt service each year is paid from dedicated funds.

⁴ Source: Department of Finance General Fund Multi-Year Forecast, 2019 Budget Act.

⁵ Does not reflect offsets due to subsidy payments from the federal government for BABs or transfers from special funds. When debt service is adjusted to account for approximately \$2.0 billion of estimated offsets, the 2019-20 debt service decreases to \$6.0 billion and the ratio of debt service to General Fund revenues drops to 4.19 percent.

⁶ Moody's calculation of net tax-supported debt includes GO bonds (non self-liquidating), LRBs, Enterprise Revenue Bonds, GO commercial paper notes, federal Highway Grant Anticipation Bonds, tobacco securitization bonds with a General Fund backstop, various regional center bonds, and State Building Lease Purchase bonds.

⁷ California GDP as reported by the U.S. Bureau of Economic Analysis for 2018. Sovereign country ranking and GDP for 2018 as reported by the International Monetary Fund.

FIGURE 13

DEBT TO PERSONAL INCOME OF 10 MOST POPULOUS STATES

STATE	MOODY'S/S&P/ FITCH (a)	DEBT TO PERSONAL INCOME (b)
Texas	Aaa/AAA/AAA	0.80%
North Carolina	Aaa/AAA/AAA	1.20%
Michigan	Aa1/AA/AA	1.40%
Florida	Aaa/AAA/AAA	1.70%
Georgia	Aaa/AAA/AAA	2.30%
Ohio	Aa1/AA+/AA+	2.50%
Pennsylvania	Aa3/A+/AA-	3.00%
California	Aa3/AA-/AA	3.70%
New York	Aa1/AA+/AA+	5.00%
Illinois	Baa3/BBB/BBB	5.10%
MOODY'S MEDIAN ALL STATES		2.2%
MEDIAN FOR THE 10 MOST POPULOUS STATES		2.4%

(a) Moody's, S&P and Fitch ratings as of August 2019.

(b) Figures as reported by Moody's in its 2019 State Debt Medians Report released June 2019. As of end of calendar year 2018.

and one of its most diverse. In its 2019 State Debt Medians report, Moody's lists the state's net tax-supported debt as percentage of GDP at 3.09 percent.⁶

DEBT RATIOS OF THE 10 MOST POPULOUS STATES

In its State Debt Medians report, Moody's calculates for each state the ratios of debt to personal income, debt per capita and debt as a percentage of GDP and provides the median ratios across all states. It's useful to compare California's debt levels with those of its "peer group" of the 10 most populous states. As shown in the tables, the median debt to personal income (Figure 13), debt per capita (Figure 14) and debt as a percentage of GDP (Figure 15) of these 10 states are, on average, in line with Moody's median for all states combined. California's ratios, however, are higher than the medians for the 10 most populous states.

FIGURE 14

DEBT PER CAPITA OF 10 MOST POPULOUS STATES

STATE	MOODY'S/S&P/ FITCH (a)	DEBT PER CAPITA (b)
Texas	Aaa/AAA/AAA	\$389
North Carolina	Aaa/AAA/AAA	\$531
Michigan	Aa1/AA/AA	\$630
Florida	Aaa/AAA/AAA	\$812
Georgia	Aaa/AAA/AAA	\$996
Ohio	Aa1/AA+/AA+	\$1,156
Pennsylvania	Aa3/A+/AA-	\$1,577
California	Aa3/AA-/AA	\$2,194
Illinois	Baa3/BBB/BBB	\$2,752
New York	Aa1/AA+/AA+	\$3,247
MOODY'S MEDIAN ALL STATES		\$1,068
MEDIAN FOR THE 10 MOST POPULOUS STATES		\$1,076

(a) Moody's, S&P and Fitch ratings as of August 2019.

(b) Figures as reported by Moody's in its 2019 State Debt Medians Report released June 2019. As of end of calendar year 2018.

FIGURE 15

DEBT AS A PERCENTAGE OF STATE GDP OF 10 MOST POPULOUS STATES

STATE	MOODY'S/S&P/ FITCH (a)	DEBT AS % OF STATE GDP (b)(c)
Texas	Aaa/AAA/AAA	0.68%
North Carolina	Aaa/AAA/AAA	1.02%
Michigan	Aa1/AA/AA	1.24%
Florida	Aaa/AAA/AAA	1.77%
Georgia	Aaa/AAA/AAA	1.86%
Ohio	Aa1/AA+/AA+	2.09%
Pennsylvania	Aa3/A+/AA-	2.68%
California	Aa3/AA-/AA	3.09%
New York	Aa1/AA+/AA+	3.97%
Illinois	Baa3/BBB/BBB	4.25%
MOODY'S MEDIAN ALL STATES		2.06%
MEDIAN FOR THE 10 MOST POPULOUS STATES		1.98%

(a) Moody's, S&P and Fitch ratings as of August 2019.

(b) Figures as reported by Moody's in its 2019 State Debt Medians Report released June 2019. As of end of calendar year 2018.

(c) State GDP numbers have a one-year lag.

SECTION 4 ANALYSIS OF THE STATE'S CREDIT RATINGS

The state's current GO bond ratings are "AA" from Fitch, "Aa3" from Moody's and "AA-" from S&P. A summary of the latest rating agencies' actions on the state's GO bonds is presented in Figure 16.

Since the last DAR, a year ago, Fitch has upgraded the state's GO rating from "AA-" to "AA" while maintaining a stable outlook. Moody's has maintained their "Aa3" rating with a positive outlook and S&P has maintained their "AA-" rating with a stable outlook respectively. A summary of the rating agencies' opinion of the state's credit strengths and challenges is presented in Figure 17.

FIGURE 16

LATEST RATING ACTIONS

RATING AGENCY	ACTION	DATE
Fitch	Upgraded the state's GO ratings from "AA- stable" to "AA stable"	August 2019
Moody's	Affirmed "Aa3 positive" rating	August 2019
S&P	Affirmed "AA- stable" rating	August 2019

FIGURE 17

STATE OF CALIFORNIA GENERAL OBLIGATION RATING AGENCY COMMENTARY

	FITCH	MOODY'S	S&P
RATING STRENGTHS	<ul style="list-style-type: none"> Large, and diverse economy Improved fiscal management that allows resilience through economic cycles Strong budget management eliminating budgetary borrowing and reserving a portion of revenues in reserves 	<ul style="list-style-type: none"> Massive and diverse economy Robust revenue growth and accumulation of healthy liquidity 	<ul style="list-style-type: none"> Diverse and expanding economy Commitment to aligning recurring revenues and expenses while paying down budgetary debts Good budgetary reserve levels Strong overall liquidity and declining debt ratios
RATING CHALLENGES	<ul style="list-style-type: none"> Maintaining fiscal discipline within the legislative and executive branches of state government throughout economic cycles 	<ul style="list-style-type: none"> Highly volatile revenue structure Vulnerability to changes in federal policy and funding Legislative supermajority requirement to raise new revenue Long-term liability and fixed cost burdens higher than state medians 	<ul style="list-style-type: none"> High cost of housing relative to other states Difficult to forecast revenues due to volatile revenue base and reliance on personal income taxes Minimal prefunding of retiree health care benefits Large backlog of deferred maintenance and infrastructure needs

APPENDIX A | THE STATE'S DEBT

AUTHORIZED AND OUTSTANDING NON SELF-LIQUIDATING GENERAL OBLIGATION BONDS AS OF JUNE 30, 2019 (DOLLARS IN THOUSANDS)

GENERAL FUND BONDS	VOTER AUTHORIZATION DATE	AUTHORIZATION AMOUNT	LONG-TERM BONDS OUTSTANDING	COMMERCIAL PAPER OUTSTANDING (a)	UNISSUED
1988 School Facilities Bond Act (b)	11/08/88	\$797,745	\$26,410	\$ -	\$ -
1990 School Facilities Bond Act (b)	06/05/90	797,875	55,320	-	-
1992 School Facilities Bond Act (b)	11/03/92	898,211	136,615	-	-
California Clean Water, Clean Air, Safe Neighborhood Parks, and Coastal Protection Act of 2002 (f)	03/05/02	2,596,643	1,893,575	20,845	166,578
California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access For All Act of 2018	06/05/18	4,100,000	12,540	35,870	4,049,065
California Library Construction and Renovation Bond Act of 1988 (b)	11/08/88	72,405	7,540	-	-
* California Park and Recreational Facilities Act of 1984 (b)	06/05/84	368,900	7,215	-	-
* California Parklands Act of 1980	11/04/80	285,000	1,410	-	-
California Reading and Literacy Improvement and Public Library Construction and Renovation Bond Act of 2000	03/07/00	350,000	205,795	-	5,040
* California Safe Drinking Water Bond Law of 1976 (b)	06/08/76	172,500	1,910	-	-
* California Safe Drinking Water Bond Law of 1984	11/06/84	75,000	1,155	-	-
* California Safe Drinking Water Bond Law of 1986	11/04/86	100,000	13,535	-	-
California Safe Drinking Water Bond Law of 1988	11/08/88	75,000	18,775	-	-
* California Wildlife, Coastal, and Park Land Conservation Act (b)	06/07/88	768,670	70,195	-	-
Children's Hospital Bond Act of 2004	11/02/04	750,000	512,065	45,175	1,530
Children's Hospital Bond Act of 2008	11/04/08	980,000	740,335	31,755	168,725
Children's Hospital Bond Act of 2018	11/06/18	1,500,000	0	350	1,499,650
Class Size Reduction Kindergarten-University Public Education Facilities Bond Act of 1998 (Hi-Ed)	11/03/98	2,500,000	1,390,445	-	-
Class Size Reduction Kindergarten-University Public Education Facilities Bond Act of 1998 (K-12)	11/03/98	6,700,000	2,988,905	5,580	615
* Clean Air and Transportation Improvement Bond Act of 1990	06/05/90	1,990,000	505,685	-	4,985

**AUTHORIZED AND OUTSTANDING
NON SELF-LIQUIDATING GENERAL OBLIGATION BONDS
AS OF JUNE 30, 2019 (DOLLARS IN THOUSANDS) CONTINUED**

GENERAL FUND BONDS	VOTER AUTHORIZATION DATE	AUTHORIZATION AMOUNT	LONG-TERM BONDS OUTSTANDING	COMMERCIAL PAPER OUTSTANDING (a)	UNISSUED
* Clean Water Bond Law of 1984	11/06/84	325,000	5,205	-	-
* Clean Water and Water Conservation Bond Law of 1978	06/06/78	375,000	2,730	-	-
Clean Water and Water Reclamation Bond Law of 1988	11/08/88	65,000	12,610	-	-
* Community Parklands Act of 1986	06/03/86	100,000	1,435	-	-
* County Correctional Facility Capital Expenditure Bond Act of 1986	06/03/86	495,000	7,685	-	-
County Correctional Facility Capital Expenditure and Youth Facility Bond Act of 1988	11/08/88	500,000	36,775	-	-
Disaster Preparedness and Flood Prevention Bond Act of 2006 (e)	11/07/06	3,990,000	2,573,585	125,900	1,115,387
Earthquake Safety and Public Buildings Rehabilitation Bond Act of 1990	06/05/90	300,000	28,150	635	7,490
* Fish and Wildlife Habitat Enhancement Act of 1984	06/05/84	85,000	3,750	-	-
Higher Education Facilities Bond Act of 1988	11/08/88	600,000	14,615	-	-
Higher Education Facilities Bond Act of June 1990	06/05/90	450,000	28,125	-	540
Higher Education Facilities Bond Act of June 1992	06/02/92	900,000	177,815	-	-
Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006	11/07/06	19,925,000	16,126,740	22,760	1,041,155
Housing and Emergency Shelter Trust Fund Act of 2002	11/05/02	2,100,000	338,970	-	71,395
Housing and Emergency Shelter Trust Fund Act of 2006	11/07/06	2,850,000	1,008,720	104,940	303,135
Housing and Homeless Bond Act of 1990	06/05/90	150,000	880	-	-
Kindergarten Through Community College Public Education Facilities Bond Act of 2016 (CCC)	11/08/16	2,000,000	15,550	7,355	1,975,765
Kindergarten Through Community College Public Education Facilities Bond Act of 2016 (K-12)	11/08/16	7,000,000	1,096,960	28,725	5,840,260
Kindergarten-University Public Education Facilities Bond Act of 2002 (Hi-Ed)	11/05/02	1,650,000	1,151,575	-	-
Kindergarten-University Public Education Facilities Bond Act of 2002 (K-12)	11/05/02	11,400,000	7,921,720	9,750	6,240
Kindergarten-University Public Education Facilities Bond Act of 2004 (Hi-Ed)	03/02/04	2,300,000	1,753,785	-	58,019
Kindergarten-University Public Education Facilities Bond Act of 2004 (K-12)	03/02/04	10,000,000	7,170,525	17,045	22,200
Kindergarten-University Public Education Facilities Bond Act of 2006 (Hi-Ed)	11/07/06	3,087,000	2,753,860	840	38,775
Kindergarten-University Public Education Facilities Bond Act of 2006 (K-12)	11/07/06	7,329,000	5,867,520	6,205	196,620
* New Prison Construction Bond Act of 1986	11/04/86	500,000	925	-	-
New Prison Construction Bond Act of 1988	11/08/88	817,000	3,125	35	1,245
New Prison Construction Bond Act of 1990	06/05/90	450,000	2,695	-	605
Passenger Rail and Clean Air Bond Act of 1990	06/05/90	1,000,000	5,840	-	-
Public Education Facilities Bond Act of 1996 (Higher Education)	03/26/96	975,000	378,620	530	4,650
Public Education Facilities Bond Act of 1996 (K-12) (c)	03/26/96	2,012,035	636,005	-	-

**AUTHORIZED AND OUTSTANDING
NON SELF-LIQUIDATING GENERAL OBLIGATION BONDS
AS OF JUNE 30, 2019 (DOLLARS IN THOUSANDS) CONTINUED**

GENERAL FUND BONDS	VOTER AUTHORIZATION DATE	AUTHORIZATION AMOUNT	LONG-TERM BONDS OUTSTANDING	COMMERCIAL PAPER OUTSTANDING (a)	UNISSUED
Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act (e)	03/07/00	1,884,000	1,142,280	-	43,346
Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (e)(f)	11/07/06	5,266,357	3,223,755	176,990	1,258,562
Safe Neighborhood Parks, Clean Water, Clean Air, and Coastal Protection Bond Act of 2000	03/07/00	2,100,000	1,233,830	19,825	36,690
Safe, Clean, Reliable Water Supply Act (e)	11/05/96	969,500	410,685	-	62,915
Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century	11/04/08	9,950,000	3,170,970	15,000	5,958,190
* School Building and Earthquake Bond Act of 1974	11/05/74	150,000	9,310	-	-
School Facilities Bond Act of 1990	11/06/90	800,000	84,415	-	-
School Facilities Bond Act of 1992	06/02/92	1,900,000	283,890	-	10,280
Seismic Retrofit Bond Act of 1996	03/26/96	2,000,000	875,900	-	-
* State, Urban, and Coastal Park Bond Act of 1976	11/02/76	280,000	2,415	-	-
Stem Cell Research and Cures Bond Act of 2004	11/02/04	3,000,000	1,175,770	38,375	370,650
Veterans Homes Bond Act of 2000	03/07/00	50,000	32,170	-	975
Veterans Housing and Homeless Prevention Bond Act of 2014	06/03/14	600,000	26,550	43,865	528,470
Veterans and Affordable Housing Bond Act of 2018	11/06/18	3,000,000	0	105,760	2,894,240
Voting Modernization Bond Act of 2002	03/05/02	200,000	0	3,685	60,810
Water Conservation Bond Law of 1988	11/08/88	60,000	12,170	-	5,235
* Water Conservation and Water Quality Bond Law of 1986 (e)	06/03/86	136,500	15,900	-	230
Water Quality, Supply, and Infrastructure Improvement Act of 2014 (f)	11/04/14	7,465,000	834,590	130,530	6,436,975
Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (e)	11/05/02	3,345,000	2,400,905	34,435	267,269
TOTAL GENERAL FUND BONDS		\$152,764,341	\$72,651,425	\$1,032,760	\$34,514,506

- (a) A total of not more than \$2.3 billion of commercial paper principal plus accrued interest may be owing at one time. Bond acts marked with an asterisk (*) are not legally permitted to utilize commercial paper.
- (b) SB 1018 (06/27/2012) reduced the voter authorized amount.
- (c) SB 1018 (06/27/2012) and SB 71 (06/27/2013) reduced the voter authorized amount.
- (d) AB 639 (10/10/2013) reduced the voter authorized amount.
- (e) AB 1471 (11/04/2014) reduced the voter authorized amount.
- (f) SB 5 (6/5/2018) reduced the voter authorized amount.

**AUTHORIZED AND OUTSTANDING
SELF-LIQUIDATING GENERAL OBLIGATION BONDS
AS OF JUNE 30, 2019 (DOLLARS IN THOUSANDS)**

ENTERPRISE FUND BONDS (SELF-LIQUIDATING)	VOTER AUTHORIZATION DATE	AUTHORIZATION AMOUNT	LONG-TERM BONDS OUTSTANDING	COMMERCIAL PAPER OUTSTANDING (a)	UNISSUED
* California Water Resources Development Bond Act	11/08/60	\$1,750,000	\$28,090	\$ -	\$167,600
Veterans Bond Act of 1986	06/03/86	850,000	8,060	-	-
Veterans Bond Act of 1988	06/07/88	510,000	26,095	-	-
Veterans Bond Act of 1990	11/06/90	400,000	28,600	-	-
Veterans Bond Act of 1996	11/05/96	400,000	61,570	-	-
Veterans Bond Act of 2000	11/07/00	500,000	302,430	-	-
Veterans Bond Act of 2008 (b)	11/04/08	300,000	286,455	-	-
Veterans and Affordable Housing Bond Act of 2018 (CalVet)	11/06/18	1,000,000	99,955	-	900,045
TOTAL ENTERPRISE FUND BONDS		\$5,710,000	\$841,255	\$ -	\$1,067,645

(a) A total of not more than \$2.3 billion of commercial paper principal plus accrued interest may be owing at one time. Bond acts marked with an asterisk (*) are not legally permitted to utilize commercial paper.

(b) AB 639 (10/10/2013) reduced the voter authorized amount.

**AUTHORIZED AND OUTSTANDING
LEASE REVENUE BONDS
AS OF JUNE 30, 2019 (DOLLARS IN THOUSANDS)**

GENERAL FUND-SUPPORTED ISSUES	OUTSTANDING	AUTHORIZED BUT UNISSUED
STATE PUBLIC WORKS BOARD		
California Community Colleges	\$121,030	\$ -
California Department of Corrections and Rehabilitation	3,918,915	2,292,693
Trustees of the California State University	149,180	-
Various State Facilities (a)	4,323,450	4,076,357
TOTAL STATE PUBLIC WORKS BOARD ISSUES	\$8,512,575	\$6,369,050
TOTAL OTHER STATE FACILITIES LEASE-REVENUE ISSUES (b)	\$154,825	\$ -
TOTAL GENERAL FUND-SUPPORTED ISSUES	\$8,667,400	\$6,369,050

(a) Includes projects that are supported by multiple funding sources in addition to the General Fund.

(b) Includes \$43,555,000 Sacramento City Financing Authority Lease-Revenue Refunding Bonds State of California - Cal/EPA Building, 2013 Series A, which are supported by lease rentals from the California Environmental Protection Agency; these rental payments are subject to annual appropriation by the State Legislature.

APPENDIX B | THE STATE'S DEBT SERVICE

**SCHEDULE OF DEBT SERVICE REQUIREMENTS
FOR GENERAL FUND NON SELF-LIQUIDATING BONDS
FIXED RATE, AS OF JUNE 30, 2019**

FISCAL YEAR ENDING JUNE 30	CURRENT DEBT		
	INTEREST (a)	PRINCIPAL	TOTAL (b)
2020 (c)	\$3,575,486,407.40	\$3,262,625,000.00	\$6,838,111,407.40
2021	3,434,349,673.71	3,235,150,000.00	6,669,499,673.71
2022	3,282,609,490.55	3,380,030,000.00	6,662,639,490.55
2023	3,125,020,383.02	2,880,750,000.00	6,005,770,383.02
2024	2,993,696,126.79	2,718,820,000.00	5,712,516,126.79
2025	2,871,030,244.25	2,764,895,000.00	5,635,925,244.25
2026	2,738,832,167.33	2,828,405,000.00	5,567,237,167.33
2027	2,598,107,967.27	2,604,950,000.00	5,203,057,967.27
2028	2,477,040,795.37	2,582,820,000.00	5,059,860,795.37
2029	2,352,791,345.37	2,868,295,000.00	5,221,086,345.37
2030	2,219,954,691.62	2,562,390,000.00	4,782,344,691.62
2031	2,081,637,151.77	2,609,140,000.00	4,690,777,151.77
2032	1,956,650,563.17	2,697,840,000.00	4,654,490,563.17
2033	1,821,845,349.56	2,833,225,000.00	4,655,070,349.56
2034	1,702,284,478.42	3,283,005,000.00	4,985,289,478.42
2035	1,477,050,072.27	3,014,790,000.00	4,491,840,072.27
2036	1,299,035,537.40	2,886,700,000.00	4,185,735,537.40
2037	1,134,134,870.05	2,920,330,000.00	4,054,464,870.05
2038	966,753,792.68	3,040,325,000.00	4,007,078,792.68
2039	837,053,310.30	3,413,375,000.00	4,250,428,310.30
2040	549,320,656.35	2,067,885,000.00	2,617,205,656.35
2041	380,102,537.52	2,190,000,000.00	2,570,102,537.52
2042	277,822,537.52	1,319,000,000.00	1,596,822,537.52
2043	222,365,162.52	1,326,325,000.00	1,548,690,162.52
2044	148,796,178.14	875,000,000.00	1,023,796,178.14
2045	117,918,168.76	710,965,000.00	828,883,168.76
2046	80,321,493.76	500,000,000.00	580,321,493.76
2047	56,596,493.76	525,000,000.00	581,596,493.76
2048	30,060,746.88	650,000,000.00	680,060,746.88
2049	11,125,000.00	315,000,000.00	326,125,000.00
TOTAL	\$46,819,793,393.51	\$68,867,035,000.00	\$115,686,828,393.51

(a) The amounts do not reflect any interest subsidy under the Build America Bonds program. Subsidy not pledged to the repayment of debt service.

(b) Includes scheduled mandatory sinking fund payments. Does not include outstanding commercial paper.

(c) Represents the debt service requirements from July 1, 2019 through June 30, 2020.

**SCHEDULE OF DEBT SERVICE REQUIREMENTS
FOR GENERAL FUND NON SELF-LIQUIDATING BONDS
VARIABLE RATE, AS OF JUNE 30, 2019**

FISCAL YEAR ENDING JUNE 30	CURRENT DEBT		
	INTEREST (a)	PRINCIPAL	TOTAL (b)
2020 (c)	\$76,639,299.42	\$105,700,000.00	\$182,339,299.42
2021	74,937,858.07	154,400,000.00	229,337,858.07
2022	72,330,382.27	39,200,000.00	111,530,382.27
2023	71,761,160.96	121,100,000.00	192,861,160.96
2024	69,800,069.96	233,600,000.00	303,400,069.96
2025	65,644,721.72	176,400,000.00	242,044,721.72
2026	62,713,809.66	263,300,000.00	326,013,809.66
2027	57,789,093.36	274,600,000.00	332,389,093.36
2028	48,819,974.56	559,000,000.00	607,819,974.56
2029	37,460,580.76	467,700,000.00	505,160,580.76
2030	27,936,891.87	364,390,000.00	392,326,891.87
2031	19,927,441.76	323,600,000.00	343,527,441.76
2032	11,918,470.21	425,600,000.00	437,518,470.21
2033	3,736,083.31	271,400,000.00	275,136,083.31
2034	85,231.05	1,600,000.00	1,685,231.05
2035	65,365.05	-	65,365.05
2036	65,553.24	-	65,553.24
2037	65,176.77	-	65,176.77
2038	65,365.06	-	65,365.06
2039	65,365.08	-	65,365.08
2040	64,474.97	800,000.00	864,474.97
2041	54,159.49	-	54,159.49
2042	53,947.05	-	53,947.05
2043	53,947.05	-	53,947.05
2044	54,086.44	-	54,086.44
2045	53,983.58	-	53,983.58
2046	54,035.01	-	54,035.01
2047	48,669.52	2,000,000.00	2,048,669.52
TOTAL	\$702,265,197.25	\$3,784,390,000.00	\$4,486,655,197.25

(a) The estimate of future interest payments is based on rates in effect as of June 30, 2019. The interest rates for the daily, weekly and monthly rate bonds range from 1.25 - 3.21%. The Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006, Series 2014A currently bears interest at a fixed rate of 3.00%, and Series 2016A currently bears interest at a fixed rate of 4.00% (the "Prop 1B Put Bonds"). The Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century, Series 2017B currently bears interest at a fixed rate of 2.193% (the "Prop 1A Put Bonds"). The Prop 1B Put Bonds and the Prop 1A Put Bonds will bear interest at the respective fixed rate until each series' respective reset date, and are assumed to bear the respective fixed rates for each such series from reset until maturity.

(b) Includes scheduled mandatory sinking fund payments. Does not include outstanding commercial paper.

(c) Represents the estimated debt service requirements from July 1, 2019 through June 30, 2020.

**SCHEDULE OF DEBT SERVICE REQUIREMENTS
FOR ENTERPRISE FUND SELF-LIQUIDATING BONDS
FIXED RATE, AS OF JUNE 30, 2019**

FISCAL YEAR ENDING JUNE 30	CURRENT DEBT		
	INTEREST	PRINCIPAL	TOTAL (a)
2020 (b)	\$28,329,618.84	\$43,165,000.00	\$71,494,618.84
2021	26,638,698.78	34,835,000.00	61,473,698.78
2022	25,826,661.28	19,235,000.00	45,061,661.28
2023	25,383,662.53	15,720,000.00	41,103,662.53
2024	25,110,333.78	8,235,000.00	33,345,333.78
2025	24,878,536.28	11,100,000.00	35,978,536.28
2026	24,699,571.28	4,210,000.00	28,909,571.28
2027	24,312,657.53	23,695,000.00	48,007,657.53
2028	23,675,014.40	20,855,000.00	44,530,014.40
2029	22,917,930.64	31,900,000.00	54,817,930.64
2030	21,687,108.76	47,285,000.00	68,972,108.76
2031	20,158,518.76	46,945,000.00	67,103,518.76
2032	18,633,612.51	43,465,000.00	62,098,612.51
2033	17,331,615.01	30,730,000.00	48,061,615.01
2034	15,981,733.76	45,190,000.00	61,171,733.76
2035	14,421,367.51	41,945,000.00	56,366,367.51
2036	13,031,195.01	36,630,000.00	49,661,195.01
2037	11,863,022.51	29,005,000.00	40,868,022.51
2038	10,792,031.88	30,300,000.00	41,092,031.88
2039	9,754,062.50	26,055,000.00	35,809,062.50
2040	8,751,723.75	27,240,000.00	35,991,723.75
2041	7,585,890.00	35,165,000.00	42,750,890.00
2042	6,503,320.00	24,415,000.00	30,918,320.00
2043	5,622,017.50	25,395,000.00	31,017,017.50
2044	4,687,807.50	26,390,000.00	31,077,807.50
2045	3,699,176.25	27,475,000.00	31,174,176.25
2046	2,667,207.50	28,590,000.00	31,257,207.50
2047	1,691,375.00	23,935,000.00	25,626,375.00
2048	860,015.00	20,195,000.00	21,055,015.00
2049	286,900.00	9,565,000.00	9,851,900.00
2050	47,800.00	2,390,000.00	2,437,800.00
TOTAL	\$447,830,186.05	\$841,255,000.00	\$1,289,085,186.05

(a) Includes scheduled mandatory sinking fund payments.

(b) Represents the debt service requirements from July 1, 2019 through June 30, 2020.

**SCHEDULE OF DEBT SERVICE REQUIREMENTS
FOR LEASE-REVENUE DEBT
FIXED RATE, AS OF JUNE 30, 2019**

FISCAL YEAR ENDING JUNE 30	CURRENT DEBT		
	INTEREST (a)	PRINCIPAL	TOTAL (b)
2020 (c)	\$425,938,756.03	\$550,630,000.00	\$976,568,756.03
2021	399,740,703.46	523,525,000.00	923,265,703.46
2022	374,021,011.76	511,025,000.00	885,046,011.76
2023	350,393,909.82	468,420,000.00	818,813,909.82
2024	327,534,359.42	465,685,000.00	793,219,359.42
2025	304,275,499.90	484,460,000.00	788,735,499.90
2026	279,853,927.37	498,780,000.00	778,633,927.37
2027	254,494,566.37	524,050,000.00	778,544,566.37
2028	228,264,338.10	537,020,000.00	765,284,338.10
2029	201,419,901.60	503,435,000.00	704,854,901.60
2030	176,089,323.89	495,660,000.00	671,749,323.89
2031	151,695,308.09	488,755,000.00	640,450,308.09
2032	126,304,379.07	500,660,000.00	626,964,379.07
2033	101,937,961.88	431,930,000.00	533,867,961.88
2034	79,498,778.16	415,695,000.00	495,193,778.16
2035	57,318,202.80	377,450,000.00	434,768,202.80
2036	39,795,362.50	254,245,000.00	294,040,362.50
2037	27,779,150.00	249,975,000.00	277,754,150.00
2038	15,522,100.00	179,825,000.00	195,347,100.00
2039	7,217,712.50	124,310,000.00	131,527,712.50
2040	2,078,800.00	81,865,000.00	83,943,800.00
TOTAL	\$3,931,174,052.72	\$8,667,400,000.00	\$12,598,574,052.72

(a) The amounts do not reflect any interest subsidy under the Build America Bonds program. Subsidy not pledged to the repayment of debt service.

(b) Includes scheduled mandatory sinking fund payments.

(c) Represents the debt service requirements from July 1, 2019 through June 30, 2020.

**ESTIMATED DEBT SERVICE REQUIREMENTS
ON INTENDED SALES OF AUTHORIZED BUT UNISSUED BONDS
DURING FISCAL YEARS 2019-20 AND 2020-21**

FISCAL YEAR ENDING JUNE 30	FY 2019-20 GO SALES DEBT SERVICE	FY 2020-21 GO SALES DEBT SERVICE	FY 2019-20 LRB SALES DEBT SERVICE	FY 2020-21 LRB SALES DEBT SERVICE	TOTAL DEBT SERVICE ALL SALES
2020	\$39,600,000.00	\$ -	\$7,697,480.00	\$ -	\$47,297,480.00
2021	322,413,330.06	45,100,000.15	55,747,655.00	43,762,215.00	467,023,200.21
2022	316,733,330.18	299,429,997.03	55,755,215.00	146,425,965.00	818,344,507.21
2023	311,053,330.30	293,843,330.49	55,755,682.50	146,424,855.00	807,077,198.29
2024	305,373,330.42	288,256,663.95	55,747,445.00	146,408,390.00	795,785,829.37
2025	299,693,330.54	282,669,997.41	55,749,197.50	146,431,320.00	784,543,845.45
2026	294,013,330.66	277,083,330.87	55,749,040.00	146,423,500.00	773,269,201.53
2027	288,333,330.78	271,496,664.33	55,745,165.00	146,420,310.00	761,995,470.11
2028	282,653,330.90	265,909,997.79	55,745,682.50	146,435,870.00	750,744,881.19
2029	276,973,331.02	260,323,331.25	55,738,795.00	146,414,930.00	739,450,387.27
2030	271,293,331.14	254,736,664.71	55,737,325.00	146,421,820.00	728,189,140.85
2031	265,613,331.26	249,149,998.17	55,744,300.00	146,429,820.00	716,937,449.43
2032	259,933,331.38	243,563,331.63	55,747,245.00	146,417,945.00	705,661,853.01
2033	254,253,331.50	237,976,665.09	55,734,075.00	146,419,685.00	694,383,756.59
2034	248,573,331.62	232,389,998.55	55,752,910.00	146,422,795.00	683,139,035.17
2035	242,893,331.74	226,803,332.01	55,735,217.50	146,420,135.00	671,852,016.25
2036	237,213,331.86	221,216,665.47	18,836,430.00	146,429,040.00	623,695,467.33
2037	231,533,331.98	215,629,998.93	18,836,100.00	104,447,115.00	570,446,545.91
2038	225,853,332.10	210,043,332.39	18,851,625.00	104,449,915.00	559,198,204.49
2039	220,173,332.22	204,456,665.85	18,841,752.50	104,443,775.00	547,915,525.57
2040	214,493,332.34	198,869,999.31	18,841,502.50	104,443,235.00	536,648,069.15
2041	208,813,332.46	193,283,332.77	18,834,827.50	104,447,310.00	525,378,802.73
2042	203,133,332.58	187,696,666.23	18,841,070.00	104,445,015.00	514,116,083.81
2043	197,453,332.70	182,109,999.69	18,848,987.50	104,440,260.00	502,852,579.89
2044	191,773,332.82	176,523,333.15	18,837,625.00	104,441,430.00	491,575,720.97
2045	186,093,332.94	170,936,666.61	18,841,715.00	104,446,490.00	480,318,204.55
2046	180,413,333.06	165,350,000.07	-	104,448,300.00	450,211,633.13
2047	174,733,333.18	159,763,333.53	-	-	334,496,666.71
2048	169,053,333.30	154,176,666.99	-	-	323,230,000.29
2049	163,373,333.42	148,590,000.45	-	-	311,963,333.87
2050	157,693,431.74	143,003,333.91	-	-	300,696,765.65
2051		137,416,765.32	-	-	137,416,765.32
TOTAL	\$7,241,200,052.20	\$6,597,800,064.10	\$1,032,294,065.00	\$3,284,561,440.00	\$18,155,855,621.30



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